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rent, taxes, insurance, and repairs, £982. 11*s.* 4*d.*; printing, advertisements, stationery, and stamps, £981. 8*s.* 10*d.*; directors, auditors, and medical officers, £2,131. 7*s.*; actuary, secretary, and clerks, £2,613. 5*s.* 6*d.*; agents' charges and medical fees, £355. 15*s.* 6*d.*; solicitor and law expenses, £270. 17*s.* 7*d.*; income tax, £134. 0*s.* 5*d.*; sundries, for house and office expenses, porterage, parcels, messenger, and other small disbursements, £431. 4*s.*; balance in hand, £13,038. 4*s.* 8*d.*; total, £459,980. 5*s.* 3*d.*"

The secretary also read the following account of the assurance fund:—"Funded property and Government securities, £620,818. 15*s.*; mortgages, £454,071. 5*s.* 1*d.*; life interests and reversions, £133,724. 17*s.* 6*d.*; cash in hand, £13,038. 4*s.* 8*d.*; total, £1,221,653. 2*s.* 3*d.*; from which was deducted £1,128. 10*s.* 6*d.* for two shares and dividends unclaimed, leaving a net assurance fund of £1,220,524. 11*s.* 9*d.*"

The auditors, in their report, stated that they had examined the accounts of the Society for the year and had found them correct; they also expressed their satisfaction in being able to state that there was a sum of £3,036. 15*s.* only due in respect of interest on investments.

The chairman moved the adoption of the report, which was seconded.

In reply to questions, the actuary said the number of proposals made during the year was 654, the number of policies issued 543. 52 proposals were accepted but not completed, and 59 were declined. The premiums on account of the new assurances during the year amounted to £13,384. 6*s.* 1*d.* The amount for renewals was £134,252. 12*s.* 6*d.*; for commutation of premiums, £126. 8*s.* 1*d.*; for life premiums combined with life interest, £806. 11*s.* 8*d.* There had been remitted as bonuses, which would otherwise have been received as premiums, £2,283. 11*s.* 3*d.*; making the total receipts for premiums £150,853. 9*s.* 7*d.* The 543 policies issued during the year covered £402,969, the average amount of the new policies being £745. The claims which had accrued by deaths during the year were on account of 116 policies, assuring an aggregate of £77,116. On these policies the absolute bonuses were £7,730, the contingent bonuses £2,243, and the conditional bonuses £566. 10*s.*; making the total amount of the bonuses £10,539, and the total amount of the claims with the bonuses £87,655. The total number of policies in force on the 31st of December, 1851, was 5,950; to which were to be added 543 for last year, and, after deducting 235 policies which had gone off in the interval, there remained 6,258 in force at the end of last year. The total amount assured was £5,097,113, the average of the existing policies being £819.

The report and accounts were adopted unanimously, and the auditors re-elected.

INSTITUTE OF ACTUARIES.

We have on former occasions (see pages 101 and 195, vol. ii. of this Journal) adverted to the desirableness of using every means for the more perfect and extended cultivation of the science upon which the actuarial profession is based; and we therefore with pleasure insert the following plan (sketched by a Member of Council, well versed in such matters) for the establishment of a Mathematical Professorship in connection with the

Institute, hoping that the publicity thus given to it may lead to steps being taken for its eventual realization.

Article I. That although the actuarial and secretarial functions are not incompatible with each other, and are often therefore jointly and usefully exercised by the same person, yet that it thereby becomes the more important to publicly indicate, in a plainer form than has hitherto been done, the distinguishing characteristic of actuaries, by establishing a Mathematical Professorship, in immediate connection with their own Institute, as especially typical of a society of scientific calculators rather than of correspondents.

II. That it should be the duty of the holder of such a Professorship to deliver a course of not less than twelve lectures during each session, on such branches of mathematics as might be most likely to interest the profession, without being so wholly of a technical character as to be unattractive to mathematicians in general.

III. That it should also be the duty of such a Professor to contribute not less than two papers per annum to the Journal of the Institute.

IV. That member-tickets to the lectures, at one guinea the course, should be obtainable on application to the Treasurer or Honorary Secretaries, by all such Fellows and Associates as should express themselves desirous of upholding the Professorship.

V. That non-member-tickets, at two guineas, should be obtained at the booksellers by all such strangers as the public advertisement of "Mathematical Lectures" by a Professor of repute might induce to attend.

VI. That the Professor should be guaranteed an honorarium of £ for each course, half of such sum to be payable one month previous to the first lecture, and the remaining half, with such an additional honorarium as circumstances might justify, one month after the concluding lecture.

VII. That the Professor should be requested to take into his consideration the possibility or otherwise of establishing an instruction class for such Associates as might be preparing for their examination, and willing to pay such fees to the Professor as might be deemed fit and proper; and also whether an account should not be kept of the attendances of each Associate upon such a class, as collateral evidence for the Examiners of a desire or otherwise to acquire the requisite mathematical proficiency.

As connected with the subject, we append the questions put before the candidates at the last examination, not on the score of their importance, but as affording useful information to the younger members of the Institute.

Matriculation Examination, 1852.

1. Divide $\frac{4}{9}$ of $\frac{5}{7}$ by $3\frac{4}{12}$.
2. What is the value of $\frac{3}{21}$ of £1?
3. Express the foregoing value by a decimal fraction of a pound.
4. Referring to the questions 2 and 3, how is it that the expression for the value in the one case is finite and in the other infinite?
5. Referring as before, how much is the decimal value short of the fractional one?
6. What is meant by the logarithm of a number?
7. What are the chief properties of logarithms?
8. If the logarithm of 10 be 1, within what numerical limits will the logarithms of numbers between 100 and 1000 be?

9. What index will the logarithm of the fraction ·6375 have in the same system?

10. Find by logarithms the fifth root of 4·44.

11. Given $\left.\begin{cases} \dfrac{x+y}{3}+1=6 \\ \dfrac{x-y}{7}+3=4 \end{cases}\right\}$ to find x and y.

12. Prove that, if one fraction be equal to another, the sum of the numerator and denominator divided by their difference, or their difference divided by their sum, for the one, is equal to the like for the other, that is—

$$\text{If } \frac{m}{n}=\frac{p}{q}, \text{ then } \frac{m+n}{m-n}=\frac{p+q}{p-q}, \text{ and } \frac{m-n}{m+n}=\frac{p-q}{p+q}.$$

13. In the general quadratic equation $x^2+px+q=0$, under what conditions will the two values of x be equal to each other?

14. If m and n be the two values of x in the above equation, show that $m+n=-p$ and $m.n=q$.

15. There are three numbers in geometrical progression whose product is 216, and sum 21. What are the numbers?

16. Show that the sum of the series

$$\frac{1}{m.(m+r)}+\frac{1}{(m+r).(m+2r)}+\frac{1}{(m+2r).(m+3r)}+ \text{ \&c., } \textit{ad infin.},$$

is equal to $\dfrac{1}{mr}$.

17. If the series $a+ar+ar^2+$, &c. be continued *ad infinitum*, show that the sum of it becomes equal to $\dfrac{a}{1-r}$ when r is a proper fraction.

18. How many permutations can be formed of n things taken two and two together?

19. Why is the number of combinations which can be so formed out of n things only half the number shown in the answer to the foregoing question?

20. Prove that the number of permutations of n things, taken all together, is equal to $1.2.3.4.\dots.n$.

21. Prove that the number of combinations of n things, taken m together, is equal to $\dfrac{n.\overline{n-1}.\overline{n-2}\dots.(n-m+1)}{1\ \ 2\ \ 3\ \dots\dots\ m}$.

22. What is the object of the Binomial Theorem?

23. Expand $(1+x)^n$.

24. Find the sum of all the coefficients of an expanded binomial.

25. Show by actual addition the succeeding terms of a series, the first of which is u, and the successive differences of whose terms are du, d^2u, d^3u, d^4u, &c.

26. Point out the analogies which lead us to infer that for the nth term we may write $u_n=u+ndu+\dfrac{n(n-1)}{1.2}d^2u+$ &c., and for the nth difference, $d^nu=u_n-nu_{n-1}+\dfrac{n(n-1)}{1.2}\cdot u_{n-2}-$ &c.

27. Show that, if a side of any triangle be produced (1) the exterior angle is equal to the two interior and remote angles, and (2) the three interior angles of every triangle are together equal to two right angles.

28. Show that in any right-angled triangle, the square which is described upon the hypothenuse, that is, the side subtending the right angle, is equal to the squares described upon the sides which contain the right angle. When the sides of a right-angled triangle are 30 and 40, what is the hypothenuse?

29. Show that, if a straight line fall upon two parallel straight lines, (1) it makes the alternate angles equal to one another; (2) the exterior angle equal to the interior and remote upon the same side; and (3) the two interior angles upon the same side together equal to two right angles.

30. Draw through a given point between two straight lines not parallel a straight line which shall be bisected in that point.

PROCEEDINGS OF THE INSTITUTE.

First Ordinary Meeting, Session 1852–53.—*Monday, 29th November,* 1852.

John Finlaison, Esq., President, in the Chair.

The President opened the Meeting with an address, in which he reviewed the progress of the Institute, now entering on its *Fifth* Session.

The Minutes of the last Ordinary Meeting were then read and confirmed.

The Secretary announced numerous valuable donations to the Library.

The Right Honourable Lord Overstone was elected an Honorary Member of the Institute.

The following Candidates, duly nominated at the last Meeting, were elected Associates of the Institute, viz.:—

Henry Tompkins. | J. A. Bird.

The following papers were read, viz.:—

"On Formulæ for Obtaining the Values of Policies, at an Intermediate Period of the Year." By James Meikle, Esq.

"On the Life Assurance Companies of Germany; their Constitution, Condition, and Prospects." By Herr Rath G. Hopf, of Gotha. Translated from the German by Samuel Brown, Esq.

"On the Insurance Companies of Austria." By Herr S. A. Daninos, of Trieste. Translated from the French.

Second Ordinary Meeting, Session 1852–53.—*Monday, 27th December,* 1852.

John Finlaison, Esq., President, in the Chair.

The Minutes of the last Ordinary Meeting having been read and confirmed, the Secretary announced several donations to the Library.

The President announced the result of the First or Matriculation Examinations, by which it appeared that of eleven Associates who had come forward in London, ten had passed, the first five with great credit as placed, viz.:—

George Scott. E. H. Galsworthy.
William Beverley.
J. B. Haycraft. Thomas Carr.

John Coles.
Edward Cutbush.
Charles Griffiths.
J. P. Lawrence.
Charles Watkins.

And that six Candidates had offered themselves for examination in Edinburgh, and had all passed; their names appearing in the following order of merit, viz.:—

D. R. W. Huie.
Thomas Miller, Jun.
D. C. Smith.
C. M. Martin.
James Wilson.
A. G. Ramsay.

The following Candidates, duly nominated at the last Ordinary Meeting, were elected Associates of the Institute, viz.:—

R. Browne.
Thomas Brown, Jun.
C. G. Fothergill.
E. H. Galsworthy.
J. T. Hamerton.
A. J. Knight.
W. M. Makeham.
Thomas Miller, Jun.
H. T. Mills.
W. P. Pattison.
George Scott.

Mr. Jellicoe, V.P., read a paper "On the Objectionable Character of certain Methods, very generally practised, for Determining and Dividing Surplus in Life Assurance Companies."

Third Ordinary Meeting, Session 1852–53.—*Monday,* 31*st January,* 1853.

W. T. Thomson, Esq., V.P., in the Chair.

The Minutes of the last Ordinary Meeting having been read, the Secretary announced several valuable donations to the Library.

The following Candidates, duly nominated at the last Ordinary Meeting, were elected Associates of the Institute, viz.:—

Official Associate—Richard Ray.

Associates.

Walter Brown.
J. Foot.
C. W. Gibbon.
John Gill.
J. G. Hooton.
George Stephenson.
Edwin Sympson.
James Terry.

A discussion on Mr. Jellicoe's paper took place, in which Mr. Pinckard, Mr. Reddish, Mr. Jenkin Jones, Mr. Hodge, Mr. Farren, V.P., the Chairman, and Mr. Lodge, bore part; and Mr. Jellicoe having replied, the Meeting adjourned to Monday, 28th of February.

(For heads of discussion see *Athenæum*, February 19th.)

Fourth Ordinary Meeting, Session 1852–53.—*Monday,* 28*th February,* 1853.

Charles Jellicoe, Esq., V.P., in the Chair.

The Minutes of the last Ordinary Meeting having been read and confirmed, the Secretary announced various donations to the Library.

The following Candidates, duly nominated at the last Ordinary Meeting, were elected Associates of the Institute, viz.:—

Official Associate—S. L. Laundy.

Associates.

George Adams.
John Craig.
James Muir.
R. S. Price.

The special thanks of the Meeting were voted to Mr. Thomson, V.P., for his kind present of 200 copies of Mr. Sang's "Essay on Life Assurance," which had been distributed among the Members of the Institute resident in London.

Mr. Hardy, V.P., read a paper entitled "An Exposé of the Fallacy 'That it is Just to Tax Temporary Annuities at the same rate as Perpetual Annuities.'"

A discussion ensued, in which Mr. Hill Williams, Mr. Farren, V.P., Mr. Hodge, Mr. Farr, Mr. Lodge, Mr. Hardy, V.P., and the Chairman, took part.

(For heads of discussion see *Athenæum*, 5th March.)